COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

GROUND WATER DISCHARGE GENERAL PERMIT
For the Discharge To The Ground From Open-Loop Geothermal Well Systems

Date of Issuance: Date of Expiration:

AUTHORITY FOR ISSUANCE

Pursuant to authority granted by Chapter 21, Sections 26-53 of the Massachusetts General Laws, as amended, and 314 CMR 5.00, the Massachusetts Department of Environmental Protection (the Department or MassDEP) hereby issues this general permit (the "General Permit") for open-loop geothermal well systems that withdraw water from the ground so that it may be used for heating and/or cooling and returned to the ground and the discharge to the ground from such systems. A person granted coverage under the General Permit is a permittee authorized to construct, operate and maintain the covered facilities and to discharge effluent from said facilities only in accordance with all the terms and conditions of the General Permit. A violation of the terms and conditions set forth herein is a violation of the General Permit, 314 CMR 5.00, and the Massachusetts Clean Waters Act, M.G.L. c. 21, sec. 26-53. MassDEP has also prepared a Fact Sheet for the General Permit. This Fact Sheet is incorporated and made part of the General Permit. The Fact Sheet outlines the factual and legal basis for the General Permit, identifies the types of facilities that are eligible for coverage under the General Permit and the process for requesting coverage under the General Permit.

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[NAME & TITLE OF SIGNATURE] **[DATE OF SIGNATURE]**

I. SPECIAL CONDITIONS

A. Effluent Limits

The permittee is authorized to discharge into the ground an effluent whose characteristics within one month of startup and continuing thereafter shall meet the following effluent limitations.

a) Unless expressly authorized by the Department, the specific conductance of the effluent shall not exceed background levels.

b) Except as otherwise provided herein, the pH of the effluent shall not be less than 6.5 or greater than 8.5 at any time. If under natural conditions the pH of the receiving ground water is less than 6.5 or greater than 8.5, the pH of the effluent shall not vary from the naturally occurring pH by more than 0.2 units.

c) The discharge of the effluent shall not interfere with the use of the ground water as an actual or potential source of drinking water and the use of surface waters for their existing and designated uses. The discharge of effluent shall not cause or contribute to a violation of the Surface Water Quality Standards, 314 CMR 4.00.

d) The average daily flow shall not exceed the average daily flow specified in the Notice of Intent requesting coverage under the General Permit.

e) The effluent shall not contain a visible oil sheen.

f) The temperature of the effluent shall not be 30 degrees Fahrenheit above or below the naturally occurring temperature of the receiving ground water.

B. Monitoring and Reporting

1) The permittee shall monitor and record the quality and quantity of the **effluent** waste stream prior to discharge to the ground according to the following schedule and other provisions:

EFFLUENT FROM THE OPEN-LOOP GEOTHERMAL WELL SYSTEM:

Parameter	Minimum Frequency of Analysis	Sample Type
Flow	Daily	Reading-report Max-Min-Avg
Temperature	Quarterly	Grab
pH	Quarterly	Grab
Specific Conductance	Quarterly	Grab

2) Any grab sample or composite sample required to be taken less frequently than daily shall be taken during the period of Monday through Friday inclusive. All composite samples shall be taken over the operating day.

3) The permittee shall submit all monitoring reports within thirty (30) days of the last day of the reporting month. Reports shall be on an acceptable form, properly filled and signed and shall be sent to the Regional Office that issues permits for discharges located within the municipality where the permittee's discharge occurs and to the Program Director, Watershed Permitting, Department of Environmental Protection, One Winter Street/5th Floor, Boston, MA 02108.

   Submission of monitoring reports in electronic format is available through eDEP and serves as data submission to both the Regional and Boston offices. To register for electronic submission go to: *http://www.mass.gov/dep/service/compliance/edeponlf.htm*

C. Supplemental Conditions

1. If the open-loop geothermal system is constructed after coverage is granted under the General Permit, the permitee shall not operate the system unless and until the Department has authorized the operation of the system in writing. To obtain such authorization, the permittee shall submit to the Department the following information at least forty-five (45) days before the date the permittee plans to place the system into operation:

   The results of the sampling done in accordance with the sampling plan required by the Fact Sheet incorporated and made part of this General Permit to determine whether the ground water proposed to be used for heating and/or cooling contains any pollutants in excess of the water quality based effluent limits set forth in 314 CMR 5.10(3).

   As -built plans that show the well and piping configuration including the taps for taking water quality samples of the ground water both immediately after it is withdrawn from the

ground for use in heating and/or cooling and before it is returned to the ground, flow metering locations for monitoring the volume of water withdrawn from the ground and the volume of water returned to the ground after being used for heating and/or cooling and automatic shutoff devices activated by changes in pressure. The as-built plans shall show that the ground water is being returned to the same aquifer from which it is withdrawn. If the sampling shows that the ground water proposed to be used for heating and/or cooling contains any pollutants in excess of the water quality based effluent limits set forth in 314 CMR 5.10(3), the as –built plans shall also show that the ground water is being returned to the same subsurface unit within the aquifer.

A copy of the well completion report required to be submitted to the Department of Conservation and Recreation by 313 CMR 3.00.

The results of the sampling done in accordance with the sampling plan required by the Fact Sheet incorporated and made part of this General Permit to ensure that the return lines and bleed lines are properly disinfected. If the sampling reveals the presence of bacteria, the permittee shall disinfect the lines and resample until the results indicate that the bacteria has been eliminated.

A plan and schedule for sampling the ground water used for heating and/or cooling for lead and copper before it is returned to the ground to determine whether it exceeds the action levels for these parameters established by the Drinking Water Regulations of Massachusetts, 310 CMR 22.00. Said plan shall require that all sampling and analysis be conducted in accordance with methods approved by 40 Code of Federal Regulations Part 136 or alternative methods approved by the Department. Samples shall be analyzed by a laboratory certified for lead and copper by the Department, of if no such laboratory is available, a laboratory certified by EPA. Said schedule shall provide for the sampling to take place between sixty (60) and ninety (90) days after the system goes into operation.

An Operations and Maintenance Plan for the open-loop geothermal system. The Operations and Maintenance Plan shall provide that a professional technician service the system at least once a year. The Operation and Maintenance Plan shall provide that the system be operated and maintained in accordance with the manufacturer’s specifications. The Operations and Maintenance Plan shall also include a plan for controlling corrosion in the system.

A plan for managing bleed-off water (if proposed) including a description of the method of bleed-off water disposal and the location of disposal areas. This plan shall detail the circumstances under which bleeding will take place, the anticipated frequency of bleeding and the anticipated volume of bleed-off water and document compliance with all applicable local, state, and federal regulations.[1] The plan shall also identify any potential thermal impacts of the proposed discharge on surface waters or wetlands and the actions that will be taken to eliminate or reduce those impacts. If the bleed-off water is proposed to be discharged to the ground, plans and supporting hydrogeologic information that verify that the site is capable of infiltrating the discharge(s) without failure shall also be included.

The status of all permits required for the open-loop system.

2. Within one hundred and eighty (180) days of placing the system into operation, the permittee shall submit the results of the sampling performed in accordance with the sampling plan approved by the Department to determine whether the ground water used for heating and/or cooling contains concentrations of lead or copper that exceed the action levels established by the Drinking Water Regulations of Massachusetts, 310 CMR 22.00, for those parameters. If the action level for lead and/or copper has been exceeded, the Department may require the permittee to cease operation of the system, apply for and obtain an individual permit, and/or take other corrective action.

3. The permittee shall design, construct, operate and maintain the open-loop geothermal system in accordance with all applicable state laws and regulations including without limitation 314 CMR 5.00, 314 CMR 3.00, 310 CMR 36.00, 310 CMR 10.00, 310 CMR 40.0000 and 313 CMR 3.00. The permittee shall also operate and maintain the open-loop geothermal system in accordance with the Operations and Maintenance Plan approved by the Department and this General Permit. The permittee shall keep a log documenting compliance with the Operations and Maintenance Plan. The permittee shall make this log available to the Department upon request.

4. The permittee shall not discharge any bleed-off water from the open-loop geothermal system to the ground except in accordance with the bleed-off plan approved by the Department and this General Permit. This permit does not authorize the discharge of any bleed-off water to a surface water, a sewer system, a municipal separate storm sewer system,

[1]Ground water may not be discharged to a municipal separate storm sewer system or to a private stormwater management system unless it is uncontaminated.

or a stormwater management system. The permittee shall keep a log of all discharges of bleed-off water documenting, the date of the discharge, the location of the discharge, the water receiving the discharge, the volume of the discharge, the time the discharge began, the time the discharge ended, and the reasons for the discharge. The permittee shall make this log available to the Department upon request. The permittee shall notify the Department of any discharges of bleed-off water to the ground water or a surface water that were not anticipated in the bleed-off plan approved by the Department. Notice to the Department shall be provided orally within 24 hours from the time the permittee becomes aware of the discharge. A written submission shall also be provided within five days of the time the permittee becomes aware of the discharge. The written submission shall contain a description of the discharge including the volume, location, and exact dates and times, and if the discharge is expected to continue or to recur in the future the anticipated time it is expected to continue or recur; and steps taken or planned to reduce, eliminate, and prevent the discharge.

5. The permittee shall notify the Department at least thirty (30) days in advance of a proposed transfer of ownership of the facility for which this permit is written. Said notification shall include a written agreement between the existing and proposed new permittee containing a specific date for transfer of the permit, the proposed new permittee's assumption of responsibility for compliance with all the terms and conditions of the permit, and, if applicable, the allocation of liability and financial responsibility for the financial assurance requirements. The transfer shall not take effect until it is approved by the Department in accordance with 314 CMR 5.12(3).

6. All tests or analytical determinations to determine compliance with permit standards and requirements shall be done using tests and procedures found in the most recent version of *Standard Methods for the Examination of Water and Wastewater*.

7. The permittee shall notify the Department, in writing, within thirty (30) days of the following events:

a) The date the facility starts operation.
b) Any interruption of the operation of the facility, other than routine maintenance.
c) Final shutdown of the facility.

If the permittee has shut down the facility, the notice shall include a plan and schedule for plugging the well within ninety (90) days. The permittee shall implement that plan as approved by the Department in accordance with the schedule as approved by the Department.

8. If, at any time, the permittee detects oil or hazardous materials in concentrations in the ground water used for heating and/or cooling, the effluent, or at any other location on the site that are equal to or greater than the reportable quantity as defined in M.G.L.c. 21E and 310 CMR 40.0000, the permittee shall notify the Department in accordance with M.G.L. c. 21E, s. 7 and 310 CMR 40.0350 through 310 CMR 40.0352.

9. If the permittee is unable to meet any limit specified in Section A of this permit, the Department may initiate appropriate action to bring the permittee into compliance. Such actions may include without limitation requiring the permittee to cease the discharge, to apply for and obtain an individual permit and/or to take corrective action including without limitation the design and installation of a treatment system that would bring the discharge into compliance with the effluent limits set forth in Section A. If the pH of the effluent is less than 6.5, the Department may require that the permittee configure the open-loop geothermal system to have two separate loops, one for withdrawing the ground water used for heating and cooling, and one for heating and cooling the building(s) or structure(s) to be served by the system.

10. The permittee shall not introduce additives of any type to the ground waters used for heating and cooling and/or discharged back to the ground without the prior written approval of the Department. In the event that the permittee determines that chemical additives are needed to address certain problems with the open-loop geothermal system including without limitation fouling of the wells, the permittee shall submit to the Department for its review approval a plan for using such additives. Said plan shall identify the proposed additive, the chemical composition of such additive, the dosage rate, quantity, application schedule, and reason for the proposed use.

11. The open-loop geothermal well system shall comply with the grouting and casing requirements set forth in Chapter 4 of the Department’s Guidelines for Public Water Systems.

12. The open-loop geothermal system shall have a device that will automatically shut down the heat pumps when the compressor experiences low or high pressure.

13. The discharge from the system shall not come to the surface or flood any subsurface structure on the site or on any property adjacent to the site.

14. The discharge shall not enter any open floor drain or drainage system that could also receive interior floor drainage, chemical spillage or other wastewater.

15. A revised operations and maintenance plan shall be submitted to the Department whenever there are significant modifications to the open-loop geothermal system.

16. At least sixty (60) days prior to the expiration of the General Permit, the permittee shall file a Notice of Intent requesting continued coverage under the General Permit or file an application for an individual permit. The permittee shall submit with the Notice of Intent a report documenting compliance with the Operation and Maintenance Plan and if applicable the plan for managing bleed-off water. The permittee shall also submit analytical results demonstrating that the concentration of contaminants in the ground water used for heating and/or cooling does not contain pollutants in concentrations that exceed the water quality based effluent limits set forth in 314 CMR 5.10(3). Sampling and analysis must be conducted in accordance with methods approved by 40 Code of Federal Regulations Part 136 or alternative methods approved by the Department. All samples shall be analyzed for each parameter by a laboratory certified for that parameter by the Department, or if no such laboratory is available, a laboratory certified by EPA.

D. Special Conditions for Privately Owned Open-Loop Geothermal Systems that Require Financial Assurance Mechanisms.

The following conditions apply only to privately owned open-loop geothermal systems.

1. The permittee shall establish and maintain a financial assurance mechanism that provides for the availability of an immediate repair and replacement account to be used by the permittee solely for the immediate repair and replacement of any failing components of the open-loop geothermal system in accordance with 314 CMR 5.10(7A) and 314 CMR 5.15. The permittee shall deposit at least 15% of the estimated construction cost of the facility into an interest bearing escrow account in accordance with the financial assurance mechanism. The permittee shall replenish the account within ninety (90) days of any disbursement.

2. If the privately owned open-loop geothermal system serves at least some residential uses as defined in 314 CMR 5.02, the permittee shall establish and maintain a financial assurance mechanism in accordance with 314 CMR 5.10 (7A) and 314 CMR 5.15 that provides for the accumulation in a capital reserve account of sufficient capital to make any necessary modifications to the system and other related equipment within twenty (20) years from the date the open-loop geothermal system commenced operation or some other period determined by the Department, based on the age and condition of the system. The financial assurance mechanism shall provide for the accumulation in the capital reserve

account of an amount equal to at least 25% of the estimated construction cost of the system.

3. For purpose of the financial assurance mechanism requirements, the estimated construction cost of the open-loop geothermal system shall include the cost of constructing the open-loop geothermal system, piping, heat pump and associated mechanical equipment, but not including the land, ground and disposal area.

4. The permittee shall meet the obligation to establish the required financial assurance mechanism(s) by using the Department approved form(s). The permittee shall submit the completed form document(s) evidencing the establishment of the required financial assurance mechanism(s) to the Department for its review and approval prior to execution and thereafter maintain these document(s) as approved by the Department. The permittee shall perform all its obligations under the required financial assurance mechanism(s) as approved by the Department.

5. Except as otherwise provided herein, the financial assurance mechanism(s) required by this General Permit, 314 CMR 5.10(7A) and 314 CMR 5.15 shall be approved by the Department and in effect on the date coverage under the General Permit is granted by the Department. A permittee that constructs the open-loop geothermal system after coverage is granted under the General Permit may submit the financial assurance mechanism(s) to the Department for its review and approval no later than ninety (90) days prior to the start-up of the facility. Such a permittee shall not operate the system unless and until the Department has approved the required financial assurance mechanism(s), the financial assurance mechanism(s)is/(are) in full force and effect, and the permittee has made all contributions required prior to the start-up of the facility.

6. On or before January 31st of each year, the permittee shall submit to the Department an annual financial report identifying the initial and current balances in the immediate repair and replacement account and, if applicable, the capital reserve account. Said report shall be prepared in accordance with generally accepted accounting principles and confirm the availability of the funds in said account(s) for the purposes specified in the permit, 314 CMR 5.10(7A) and 314 CMR 5.15. Reports pertaining to the required financial assurance mechanism(s) shall be sent to the Program Director Watershed Permitting, Department of Environmental Protection, One Winter Street, 5th Floor, Boston, MA 02108.

The General Permit Conditions set forth in 314 CMR 5.19 are hereby incorporated and made part of the General Permit.